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SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

Platte and Arkansas Drainage Basins

Ву

Division of Irrigation, Soil Conservation Service
United States Department of Agriculture
and
Colorado Agricultural Experiment Station

Data included in this report were obtained by the agencies named above in cooperation with the U. S. Forest Service, National Park Service, State Engineers of Colorado, Wyoming and New Mexico and other Federal, State and local organizations.

As of APR. 1, 1951



FEDERAL-STATE COOPERATIVE
SNOW SURVEY AND IRRIGATION
WATER SUPPLY FORECASTS

FOR

PLATTE-ARKANSAS RIVER BASINS

Report Prepared

Ъу

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Miscellaneous Series Paper No. 489 Colorado Agricultural Experiment Station

WATER SUPPLY OUTLOOK PLATTE-ARKANSAS DRAINAGE BASIN

April 1, 1951

Snow accumulation to April 1 was above normal on these watersheds except for the Southern tributaries of the Arkansas. During March the increase in snow water content was about average. On the South Platte and its tributaries, snow cover is well above normal for this date. On the headwaters of the North Platte in Colorado and Wyoming snow cover is slightly above normal. Precipitation at valley elevations has been deficient for several months and soil moisture conditions are fair to poor in most districts. Except for the large reservoirs on the North Platte, the storage in most irrigation reservoirs is below last year and the past ten year average.

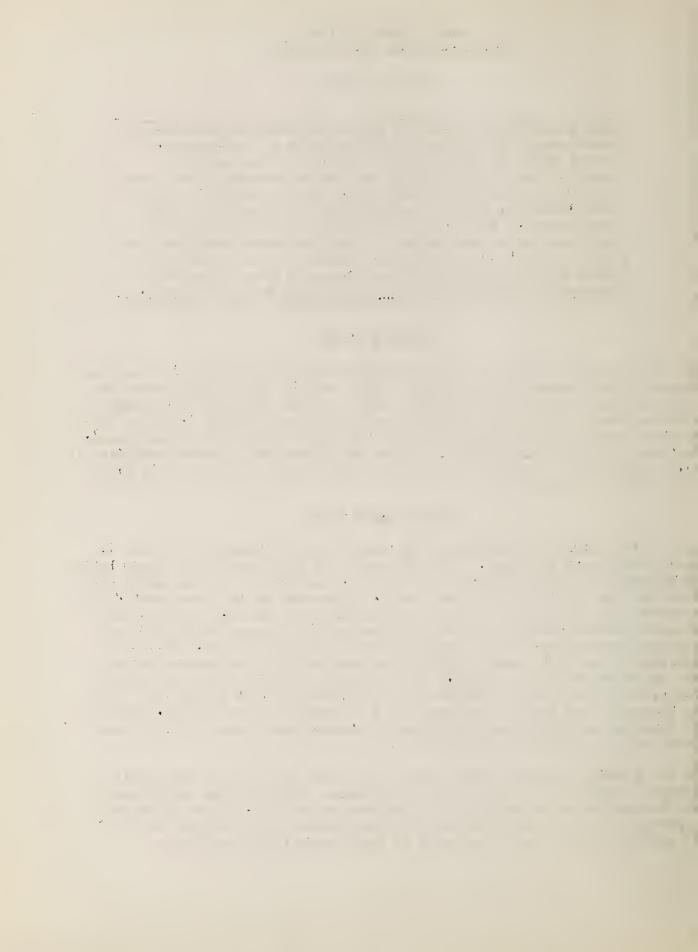
CHEYENNE RIVER

The water supply outlook for the irrigated areas near the Black Hills in South Dakota is not favorable at this time. Snow cover in the mountain areas has been much below normal throughout the winter months. On the snow courses the water content is 52 percent of average and 46 percent of April 1, 1950. Soil moisture conditions are reported as very dry and stream flow is below normal. Storage in Belle Fourche reservoir is now 94,000 acre feet as compared to 93,000 acre feet a year ago. In the Angostura reservoir there is now 32,000 acre feet in storage.

NORTH PLATTE RIVER

On the Sweetwater River in Western Wyoming the snow accumulation to date is about 110 percent of normal. Similar conditions also exist on the North Platte in Wyoming and around North Park in Colorado. On Snowy Range and Rabbit Ears Pass the snow cover is well above normal. Elsewhere on the Upper North Platte watershed the snow cover is normal or slightly below normal. In the valley areas of Eastern Wyoming and Western Nebraska soil moisture conditions are reported as very dry. Valley precipitation has been deficient. Stream flow is reported as about normal. Irrigation water supplies are assured below the major reservoirs in Wyoming. Total storage in these four reservoirs is now 1,705,000 acre feet as compared to 1,675,000 acre feet a year ago. This is a record level and is near three times the past ten year average. Storage in Kingsley and Sutherland reservoirs in Nebraska now totals 1,876,000 acre feet which is slightly more than a year ago.

On the Laramie River the snow cover is well above that on the North Platte because of heavy snow cover on the Snowy Range. Soil moisture conditions in the Laramie and Wheatland areas are reported as very dry. There is no snow reported at valley elevations at this time. Storage in Wheatland Reservoir is now 45,500 acre feet as compared to 52,000 acre feet a year ago.



SOUTH PLATTE RIVER

The irrigation water supply outlook for the South Platte and its tributaries is relatively favorable as of this date. The snow cover in mountain areas continues to be well above normal on all tributaries. March accumulation was about average which has reduced the high above normal percentages of a month ago. Carryover reservoir storage for irrigation is much less than last year and slightly less than the past ten year average. In respect to normal the snow cover on the South Platte tributaries is as follows: Poudre 132 percent; Big Thompson 140 percent; Saint Vrain 160 percent; Boulder 170 percent; Clear Creek 140 percent and Upper South Platte 140 percent. The snow cover at medium elevations is near twice normal which should provide early runoff to make up some of the deficiency in reservoir storage. Stream flow is reported as below normal. Soil moisture conditions are generally fair to poor because of a deficiency in valley precipitation during the winter months.

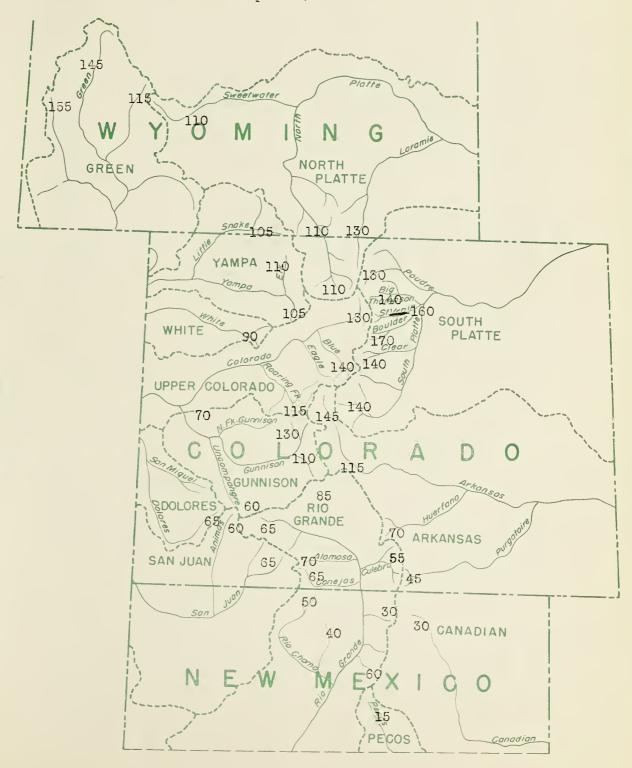
ARKANSAS RIVER

Snow cover on the Arkansas watershed is well above normal from Monarch Pass to Fremont Pass as of April 1. The extreme deficiency in snow cover still remains on the headwaters of the southern tributaries, the Huerfano, Cucharas and Purgatoire Rivers. The summer flow of these streams will probably be less than last year and near a minimum of record. The summer flow of the Arkansas at Salida and Pueblo should be well above last year and the past ten year average. Stream flow is reported as below average. Soil moisture conditions are described as poor throughout the valley. Precipitation has been deficient for several months. Except for the Twin Buttes Reservoir in southeastern Colorado carryover storage of irrigation water is very low. Some additional snow has been reported since April 1 at valley elevations.



WATER CONTENT OF SNOW ON THE WATERSHEDS OF
PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS
BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

In Percent of Mormal April 1, 1951



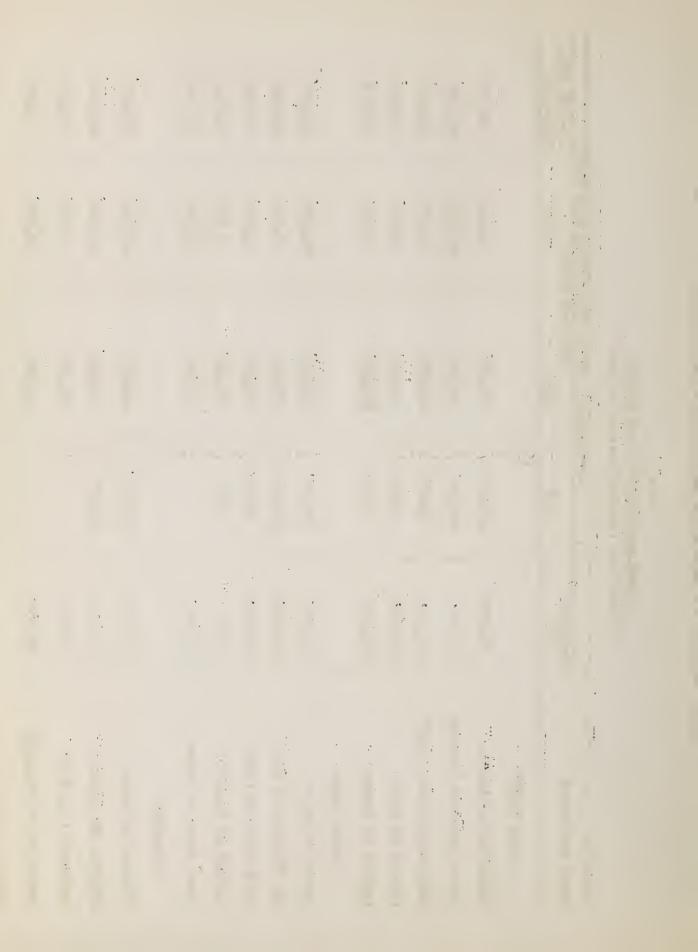


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PLATTE-ARKANSAS DRAINAGE BASINS STREAM FLOW FORECASIS, April 1, 1951

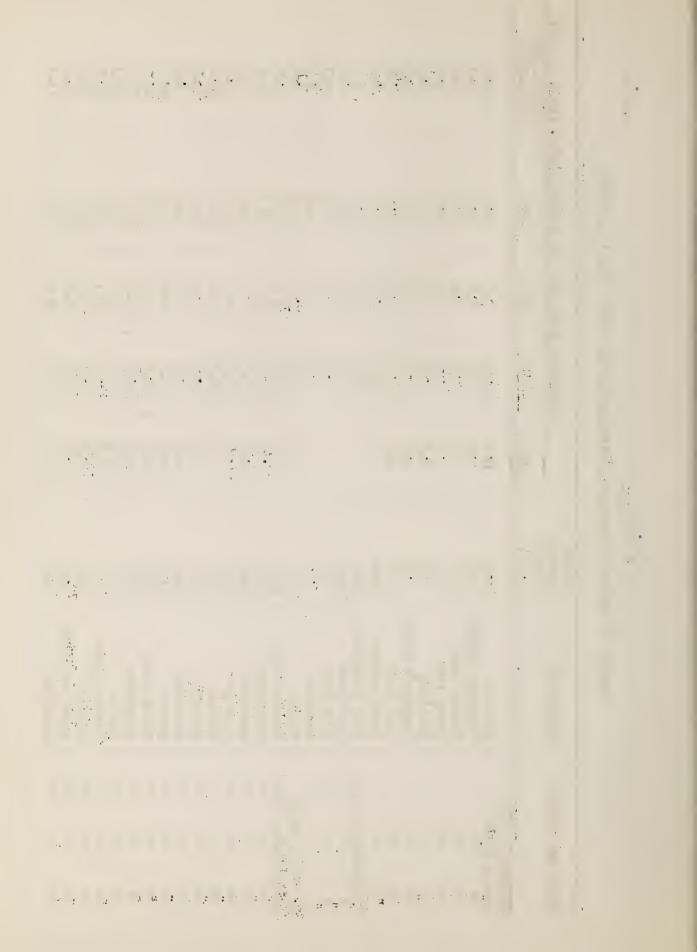
		1 mari			
Don't Charles	13	TTIde	April-Septes Incles Streaming, Acre Feet	eamilow, Acre Fee	
Dasin and Stream	rorecasu 1951	1950	Measured Runoii 	Runo11 1948	10-year Avg. 1940-1949
NORTH PLATTE					
Sweetwater at Alcova	65,000	162,000	87,000	40,000	000,99
North Platte at Saratoga	725,000	678,900	000°066	121,000	601,000
Medicine Bow near Hanna	000,211	94,000	161,000	91,000	000,111
Laranie at Jelm	120,000	26,000	113,000	83,000	93,000
Laramie at Lookout	120,000	000,79	124,000	61,000	80,000
SOUTH PLATTE					
Poudre at Canon	275,000	186,000	323,000	201,000	245,000
Big Thompson at Drake	135,000*	104,000	172,000	95,000	113,000
Saint Vrain at Lyons	120,000	69,000	000,611	64,000	87,000
Boulder at Orodell	75,000	39,000	61,000	45,000	54,000
Clear Greek at Golden	185,000		185,000	136,000	145,000
ARKANSAS					
Arkansas at Salida	450,000	305,000	1460,000	422,000	359,000
Arkansas at Pueblo	425,000	249,000	512,000	493,000	431,000
Cucharas at La Veta	10,000		16,000	17,000	19,000
Purgatoire at Trinidad	20,000		63,000	68,000	70,000
*Excluding Diversions	_				

*Excluding Diversions



STATUS OF RESERVOIR STORAGE, PLATTE-ARKANSAS PASIN, April 1, 1951

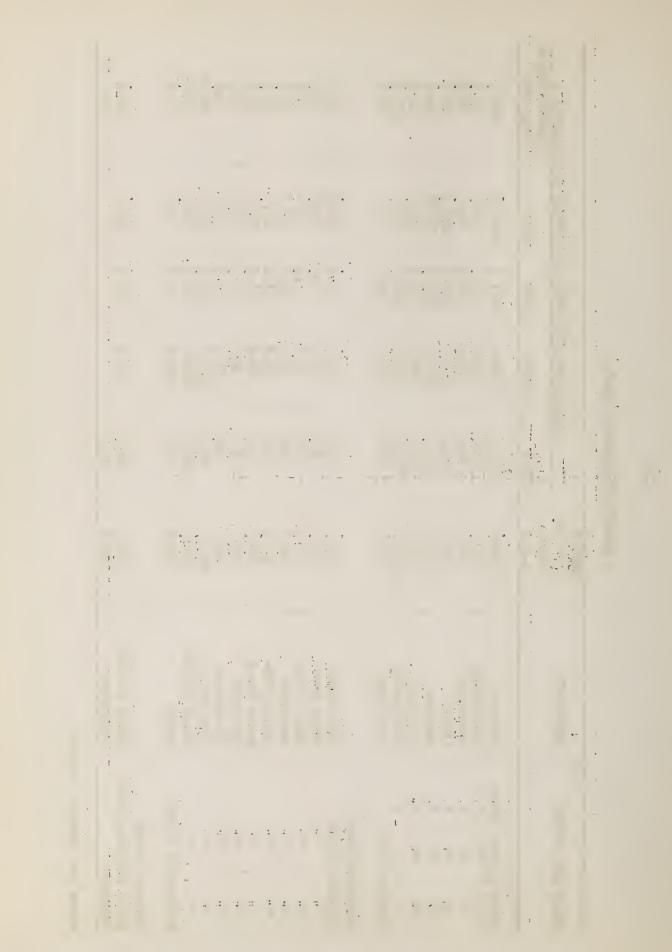
MISSOURI RIVER Windsor CAPACITY
N AND STREAM RESERVOIR Te River Cache la Poudre Cache la Poudre Cache la Poudre Fossil Creek Halligan Chamber's Lake Halligan Chamber's Lake Cobb Lake Co
N AND STREAM OURI RIVER R II II II II II II II II I
IN AND STREAM SOURI RI VER dre River " " " " " " " " " " " " " " " " " "
SOURI RIV dre River " Thompson " " " Vrain Ri " " " " " " " " " " " " " " " " " " "



RESERVOIR STORAGE, Cont.

BASIN AND STREAM	RESERVOIR	USABLE	THO	THOUSANDS ACRE FEET	E FEET IN	IN STORAGE ABOUT April	1 1
		(Thous. A.F.)	1951	1950	1949	1948	10-year Avg.* 1941-1950
Month Platte River	Kingslev	0.9661	1820.0	1798,6	1693.3	1678.8	1057.9
IOI OII I TOO OO TITAOT	Sutherland	185.0	56,5	13.8	5, LZ	51.0	48.1
=======================================	Minatare	60.8	28.4	27.2	18.1	21.0	21.5
# #	Alcova	190.0	169.7	154.8	129.8	110.3	80.0
11 11	Seminoe	1025,0	524.3	573.8	522.4	592.5	31/1.6
11 11	Guernsey	746.0	0°1/1	30°0	47.9	0.44	7.11
41 44	Pathfinder	1045.5	963.1	920.0	543.6	663.9	127.5
Laramie River	"theatland	70°7	15.6	52.3	6.04	72.7	39.5
ARKANSAS RIVER							
Arkansas River	Twin Lakes	57.9	11,2	23.7	23.1		28.5
=======================================	Sugar Loaf	17.4	χ, υ,	6.8	9°2	10.8	٥ ,
44	Clear Creek	77.7	9.0	6. 8	7.4	9,1	6.5
å: å:	Meredith	6-11	0°0	h.7	21.7	37.8	25.3
##	Horse Creek	56.9	0.0	½°9	13.1	17.7	12,1
=======================================	Adobe Creek	9.19	0°0	29,0	26.1	58,7	38.1
=======================================	Cucharas	10°G	1.9	7,0	ဝ ထ	19.8	α, α,
	Two Buttes	10.9	31,5	17.1	6,9	0,4	6,5
=======================================	John Martin	655.0	80.8	655.0	158,6	142.6	81.7*
=======================================	Great Plains	150.0	15.8	150.0	66.3	90°5	71.4
Purgatoire River	Model	15.0	0,2	15.0	0°0	1,3	4.3
CHEYENNE RIVER							
Belle Fourche River	Belle Fourche	198°1	94.3	93,0	132,1	161.4	127.9
Cheyenne	Angosture	160,0	32,0				*

*Some for shorter periods



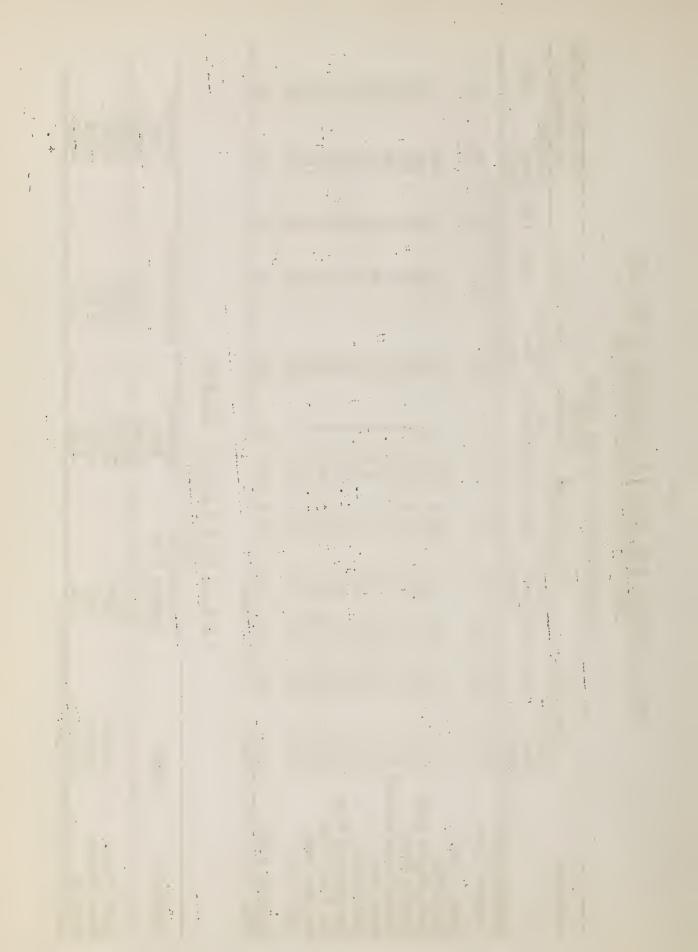
SUMMARY OF APRIL 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

PLATTE-ARKANSAS DRAINAGE BASINS

			7	ONTOWN TOWNING OWNING THE PARTY	CERTAIN	UNIT WILL		2				
							Number				1951 Wate	1951 Water Content
WATERSHEDS	Snow	Snow Depth		Water	Water Content		Courses	Snow	Snow Density		in percent of	ent of
	Fourteen			Fourteen			in	Fourteen	-		Fourteen	
	Year		1950 1951	Year	1950		1951 Average	Year	1950	1951	year	1950
	Avg.*			Avg.*				Avg.*			Avg. *	
CHEYENNE RIVER	In	In.	In,	In,	In.	In。		Percent	Percent	Percent		
Cheyenne River	25,3	34.5	14,07	6.2	6.9	32	<u>س</u>	24	50	22	52	94
PLATTE RIVER									•			
Sweetwater	45.7	0°29		13.0	24,0	14.1	5	28	36	8	108	59
North Platte River	57.9	64.2	27.	19.5	21,5	20,6	10	34	33	36	106	%
Laramie River	1,0,6	39.7	6	12,5	12,8	16.0		33	32	33	128	125
South Platte River*	27.1	23.5	32,4	7.1	6,2	10,01	m	26	56	ᄄ	142	163
Crow Creek	17.7	9.4	12.	ν, O	2.7	3.1	–	28	29	25	62	抗
Poudre River	38.2	38,3	ထ္	12,6	12.9	16,7	9	33	33	35	132	130
Big Thompson River	53.7	50,1	۲۷	16.4	16.2	22.9	2	31	32	35	170	다
St. Vrain River	45.7	13.6	57,	13.7	13.7	31,6	~	30	R R	35	157	157
Boulder Creek	37.0	36.0	ň	11.8	11°6	19.9	2	32	32	37	169	172
Clear Creek	51.8	5th 7	54,	15,6	13,4	21.7	2	30	25	34	139	162
ARKANSAS RIVER	3409	28.3	28.3 39.7	10,01	8,1	11,07	10	29	29	29	911	145
*Some for shorter periods	riods	*** pove		Denver								

PRECIPITATION DATA*
April 1, 1951

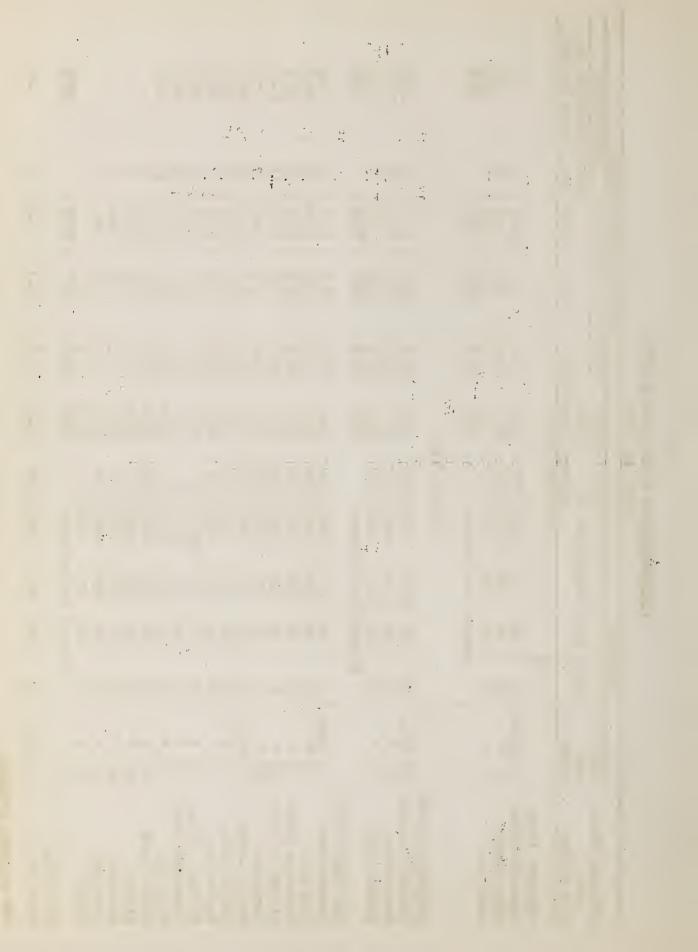
		Precipitation	Departure	Precipitation	Departure
WATERSHED	STATE	October 1 to	from	ı	from
		March 31	Normal	March	Normal
		Inches	Inches	Inches	Inches
North Platte	Wyoming	4.87	-0.98	0.81	10° 0-
South Platte	Colorado	4.32	-0°176	1,20	*0. 0 *
Arkansas Colorado	Colorado	14,78	-1,83	1,52	-0.07
*Average Selected	High Elevation St	ations			



PLATTE-ARKANSAS RIVERS SNOW SURVEYS April 1, 1951

		1	T - T		April	11 19	1751	O		0.00	440		
		Loca	Location						nover	M. SELLICEMENTS	ments		
Drainage Basin	Nos					ţe	Mou	Water Gart	37041	gs um	Past	st Record	
and	and	Seco	Twp.	Range	Ele	<u> </u>				-	of	Av. Wat	
Snow Course	State					vey'(Survey (Inches)	1951.	1950	1949	Rec.	tent (Inches)	
,					MISSO	ORI RI	VER						
		5	25.0	þ	7 6 00 3 /		ς α	ر ر		α (r	۲ ۵	
Upper Speariish	L De Dake	17	N C	1 =	6800 3/		22, T	000	~ «	0.01	- ₩	7.6	
	. E	23	1 Z	ا ا ا	0000		7,7	1 0	0 0	1 2	\ ~	o	
Deet Teete	1		Average	ÎOP	Drainage		7.11	355	6.9	8.5)	6.5	
			0		0		-	,					
					PLATT	PLATTE RIVER			-				
SWEETWATER RIVER													
Grannier Meadows	29 Wyo.	19	30N	TOOM	9000 3/	23	15.8	13,3	24,3	17.5	14	13,4	
South Pass*	77 11	ដ		Term	9000 3/23			3.4.8	23,7	17.6	Ħ	12.5	
Larsen Creek	57 "	12		103W				13.9	22,8	1	Ч	1	
		AV	(1)	for Dra				14,1	24.0	17.6		13.0	
NO. PLATTE RIVER						ter makanasana Per							
Cameron Pass	1 Colo,	2	N9	7611	10300 3/	31	61,2	25,0	18,5	27.8	15	21,1	
Park View	7 18	2μ	NS.	781			31,1	8.7	12.5	14,6	17.	10,5	
Columbine Lodge	± 00		Z.	828				29,7	24,3	28.9	15,	22.6	
Willow Cr. Passa	62 m	! -	Z	781				12.6	17.6	19.0	13	13.0	
Morthoate	136 11	ı ∝	12	7914				, ~,	٥,		, –	1	
Bot.t.10 Greek	7 May	, _	, E	87. 87.				7,0	000	7.91	i Ā	7),5	
Wohler Samina	000	2 t	14.1	ξ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				, ,	,	- 0) L) o c	
Webber Spring	= =	7 6	N71 -	100 100 100 100 100 100 100 100 100 100	9000 13/20			17°C	27.0	7.7.7	J ;	32.2	
N P COLE	; ;	7,0	T C	- E				200	200	7 10) ;	100	
	= ·	/ 7	NOT	300	TOZOO 41/	-		しなって	51°C	24.0	<u>ገ</u> ነ	6,63	
N. Barrett Creek	38	<u>۾</u>	16N	MOR	711 0016			Ič, d	20°5	25.3	<u>구</u>	20,1	
hyan Park	39 #	34	161	81M	巨			10,3	10°6	16.7	15	11,4	
Spring Creek	u 19	32	15N	85W	9000 3/	_		15,2	22°6	23.4	7		
Albany	u 89	18	14N	#8M	<u>£</u>			17,8	13.0	19°6	2		
La Bonte	" 69	디	27N	7477	<u>m</u>	/28		6,3	ر بر	10,4	2		
Boxelder	102	31	30N	75W	3			7,*1	5,4	1	~		
Pearl	71 " 7	18	12N	82W	8900 14/		20.0	5,4	-			:	
		Α̈́V	Average	for dra	drainage		57.2	20.02	21.5	26.4		19.5	
CREEK			- 1-00-1-7-00	410 Jan 21)		-						
Pole Mtn, #2	34 Eyo.	35	15N	72W	8700 3/30	 ಜ	12.2	3,1	2,2	9°6	15	v, o	
*On adjacent drains	00 00							-	-				

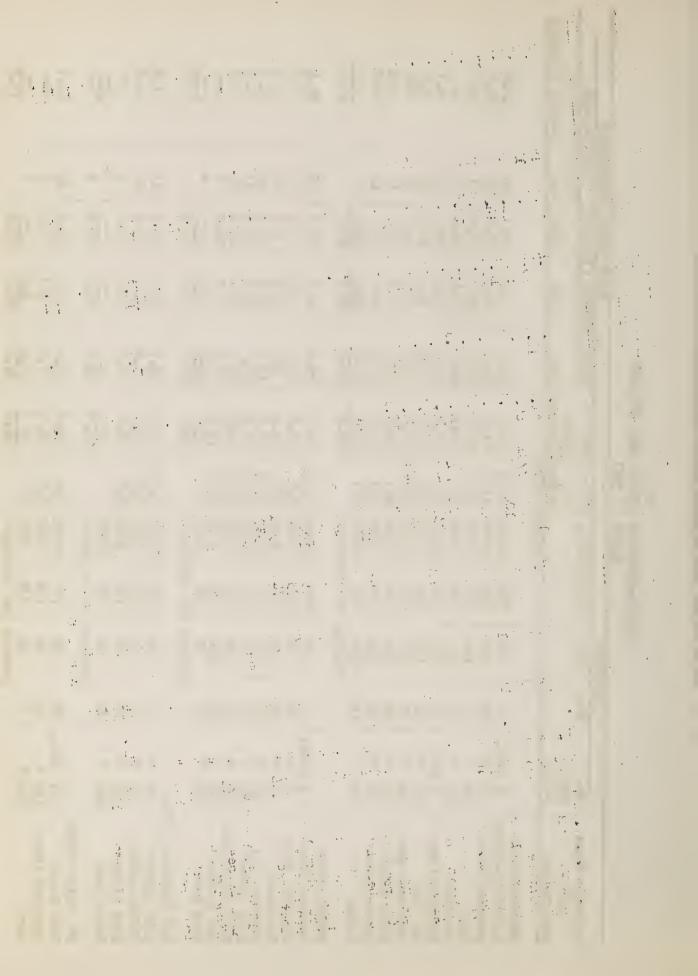
*On adjacent drainage



-8-PLATTE-ARKANSAS RIVERS SNOW SURVEYS

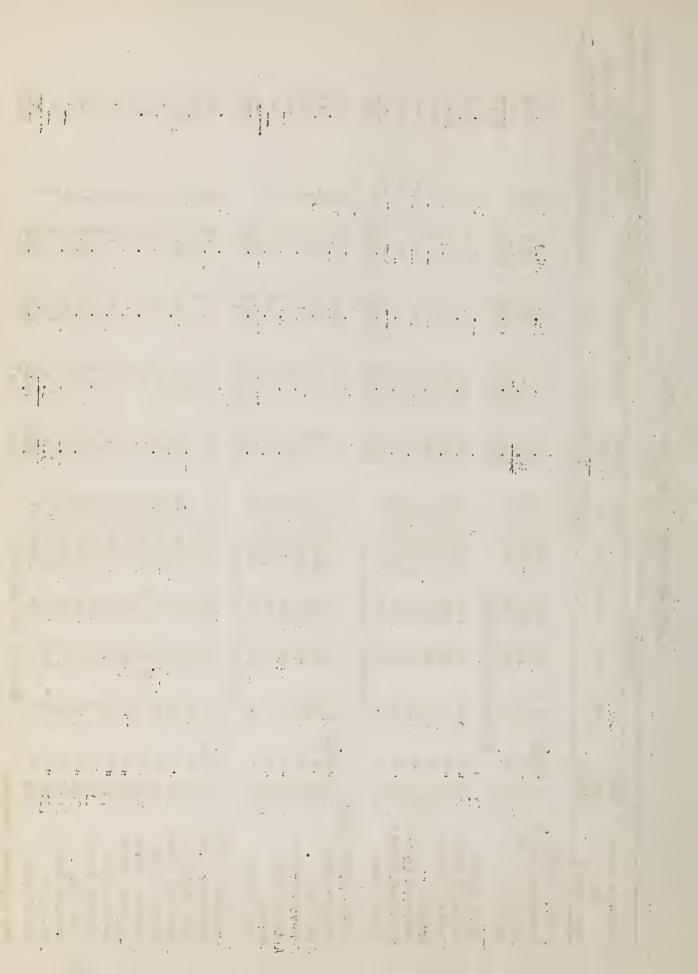
					April	1, 1951			ŧ			
		भ	cat						Snow	Cover	Snow Cover Measurement	ent
Drainage Basin	No.	Sec.	Twp.	Kange	Elev.	g	Snow	Water	Water Content (I	Inches)	Past	Rec
and Show Course	State					Survey	of Depth	ر ال	1950	01/01	Yrs. of	Av. Water Content (Inches)
20 1000					DIA中中田	R PTVER	(2011)	-//-	277-	11/1	2	
LARAMTE RIVER					1							
W.Port.GP.Tun.	4 Colo.	7	18 18	75W	8600	3/30	37.2	10.7	7.4	16.7	7.7	12.5
Deadman Hill*	50 #	56	TON	75W	10200	3/28	61.h	18,2	15.4	20.6	77	14.5
Roach	88 "	v	Not	77W	9800	3/31	65.5	20.6	17.9	24.0	Ħ	18,8
McIntyre	" נונ	35	TON		9100		13.1	12,2	10.4	1/4.5	8	ţ
Brooklyn Lake	3 Wyo.	H	16N	N62	10200	1/1	82.8	32.3	27.3	27.8	15	24,1
Fox Park		21	13N	784	9200	1/1	36.2	8.9	14.3	10.6	15	8.2
Pole Mtm. #2*	34 "	35	15,	12W	8700	3/30	12,2	3.1	2.7	9.6	15	5.0
Libby Lodge	35 =	59	16N	781	8700	7	15.5	15.9	13.2	14.0	15	9.3
Hairpin Turn	36 "	24	16N	M62	9500		52.0	18.4	14.0	15.2	5	11.2
Albany	£8 #	18	31 - ·	78	00176	[\	55.0	17.8	13.0	19.6	2	1
			Average	for	drainage		49.1	16.0	12.8	16.7		12.5
POUDRE RIVER					International							
Cameron Pass	1 Colo.	2	- 6N	7611	10300	3/29	61.2	25.0	18.5	27.8	77	21.1
Chambers Lake	2 #	9	NZ.	757	0006	1/1		11.3	0*2	9.6	15	7.8
Big South	3 =	33	8N	751	8600	1/1		3.5	2,5	3.5	15	2.7
Deadman Hill	ζ, Σ,	56	NO.	75. 15.	10200	3/28	•	18.2	15.4	20.6	1 7	14.5
	, e	ω (5N	75回	10600	3/30		30.2	20.9	29.9	n	21.0
Hour Glass Lake	<u> </u>	, 18	NZ.	731	9500	3/31		12,2	13.0	10.8	Ħ	8.7
Red Feather	128	56	JON	元	0006	3/28		ထ.	7.1	14.7	2	1
Lost Lake				S	9300	[[]		71.	1	1	1	;
GIVE MOSCINOLINE STA	ρ		Average	for dra	drainage		148.7	16.7	12.9	17.0		12.6
Take Trenes	4. 65 =	α	น้	741	00901	3/30	0 02	30.0	000	0000	13	٥
) 유 =	2, 6	\ \\ \\\	, K	0220	3,5	, T	ן ה ה ה	, רנ ה	17.8	۲ ۲	ר ב מ
Deer Ridge	7,1) 0		7.3	90,00	15	30.0	0	10	8.7	3 ~	0 1
Longs Peak	178 "	32		. E.	10500	i	}	<u>}</u>	; ; ;	3	; !	1
	i I		a	٦	ainage		65.7	22.9	16.2	23.8	2	11
ST. VRAIN RIVER				}	o				 	•	ı	
Wild Basin	41 Colo.	777	N R	741	10000	72°	61.5	21.6	H3.7	19.6	Į,	13.7
Word nake	יי סדד	7,	N 2	2	200	7	7 - 17	0 \	า า -	3	7 г	I
	13t "	4		for dus	9500	4/3	24. C	9.6	100 m	701	-1	1 6
4			Average		urainage		01.0	0.17) • CT	TX•0		10.6

*On adjacent drainage

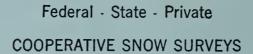


-9-PLATTE-ARKANSAS RIVERS SNOW SURVEYS April 1, 1951

Dog.			Location	lon			31.00		Snc	ow Cove	Snow Cover Measurements	ements
NO				1		(1)	Snow	water co	Content (Inches	(uches)	Past	Kecord
and State	ψ	yec.	-ČM.L	Kan ge	Elev.	of Survey	Depth (Inches)	1951	1950	1949	Yrs. of Record	Av. Water Con- tent (Inches)
					PL	PLATTE RI	VER					
ν.(Colo		28	7 Live		3/31	18.5	8,4	4.9	8 7 7	15	w (
330	: \$2	0 0	Z V	7.2 E	00501	17/2	30.0	34.0 8 .1.	η.α α	25.1	בן ר	20.1
7	AT	Average	for dre	inage		10/0	53.8	19.9	11.6	111.9	7	11.8
)		,)				`` ``				
79	=	27	S	76W		3/31	59.1	19.0	14.0	14.0	77	13.6
26	=	2	58		11250 3	3/31	-	24.3	19.1	18.7	6	17.6
711	=	27	38			./1		10.9	7.0	5.1	2	1
137	=	16	38		10500 7			19.5	1	1	1	. 1
138	=	10	3N		11300 3	1/28		17.3	1	1	1	1
160	=	27	SH	76W	11200 3	3/28		24.6	1	1	1	1
		AT	Average f	for drainage	inage			21.7	13.4	12.8	}	15.6
SOUTH PLATTE RIVER												
	Colos	<u>n</u>	& &		11400 3	/30	54.1	17.6	10.6	12.8	15	12.0
13	=	33	88			- - - -	0.0	0.0	0.0	1.9	14	1.0
83	E	77	78	76W		3/30	13.2	12.7	8,1	8.9	H	رم 8
118	=	18	જ	1 加2		/30	18.6	6.9	ا ا	L.3	2	1
120	=	Н	138	177W	9200 3	1/28	2.5	1.4	0°8	2,4	2	ŀ
130	=	28	-		0	- 230 130	6.7	1.2	0.0	1.2	7	1
		A	Average f	for drai	inage		32.4	10.1	6.2	6.6		7.1
			0	200	0000	3		(((ì	(
را د	°070	27	ט ר מ ר	30 d	10200	7 / 1	ر ر 0 د	13.2 7 - 1	2,0	200	٦ <u>-</u> ۲ ٦	α. •
25	=	25	18N	a continue er sa	10800	رار الد		7.7.	0 -	- 80 - 10 - 10 - 10	٦. 	7 C E
F	=	19	1,8N		10500	/31		12.5	2,2	13.7	12,	11,0
22	=		37.2M	2	10300 3	/29		1,0	2.2	0	77	6.7
77	=	22	288	701	9300 1	/2/		N N	4.2	1°6	15	ස්
78	=	ສ	113	81W	9700 4	1/2		6.3	3.6	2,1	15.	3,2
62	ŧ	2	ဆ	79W	11400 3	1/29		22.9	16.2	15.6	15	15.9
8	=	30	318		1,0000 3	1/30		ν. 8	3.2	10.3	23	9•9
35	= :	16	16N 16N		10500 3	1/28	-	21,1	16.0	20.0	គ	17.7
119	= :	댔'	158	80 <u>e</u>	10600 3	1/28		13.8	18,1	13.7	~	i
121	=	∞	98	8 1 .	7 00111	く		23.2	19.4	22.4	~	1
nage		A _V	Average f	or drainage	nage	*****		11.7	8,1	11.2		10.1
rai	adjacent drainage	A.	erage 1	or arai	nage	~		11.7	Q.I	11.2		







Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"